

drazyls, nitroxides, other nitrogen radicals such as aminium salts and nitro-radical-anions, aroxyl radicals, and some of the less well studied species in which the unpaired electron is associated with, for example, a boron, phosphorus, or sulphur atom.

Each group of radicals is discussed from the point of view of preparation and both chemical and physical properties. Under physical properties, thorough attention is paid to the electron spin resonance spectra of the radicals and the information they provide about the structures of the species; there is also an adequate introduction to this spectroscopic technique. Indeed, the blend of physical and organic chemistry which the authors have achieved is unusually good and provides stimulating reading.

There are probably few undergraduate courses which will require so detailed a treatment as this book gives, but for graduate work it should be an excellent source of material. For anyone doing research into the physical and/or chemical properties of organic radicals in solution, the book must be close at hand.

R. O. C. NORMAN

Correspondence

Science, Industry and Government

SIR,—In his article (*Nature*, 222, 421; 1969) Professor Flowers states that the average American income, measured by added value, is about £5,000 per annum, or four times the corresponding average British income of £1,300 per annum. The conversion of the American income from dollars to pounds sterling appears to have been carried out using the standard rate of exchange of \$2.4 to £1; this is not a valid basis for such a comparison, because £1 in Britain buys much more goods and services than does \$2.4 in the USA.

During several months in the USA over the last three years I have made a detailed comparison of relative costs in the UK and in the USA, in order to determine how many dollars are required in the USA to buy what £1 will buy in Britain; the result is as follows: housing: buy, \$6 per £1; rent, 10; food, 4.7; alcohol and cigarettes, 2.0; clothing, 4.0; fuel and light, 4.3; motoring, 7.1; manufactured goods, 3.5; services, 8 to 11.

(In motoring, petrol costs have been reckoned on miles necessarily driven per year, which are three times larger in the USA than in Britain on account of the lower population density; the cost is also based on American cars, which have a high petrol consumption and rapid deterioration; these factors account for the apparently unexpectedly high cost ratio; they make no significant difference to the final result obtained below.)

The average of these values, weighted according to the distribution of spending among these various goods and services in Britain (*Manchester Guardian Weekly*, April 1969) gives a rate of exchange corresponding to the relative purchasing powers of the pound sterling in the UK and the dollar in the USA. The result is \$5.2 to £1.

Sales and purchase taxes are included in this figure (if they were not it would be more than 5.2); income taxes are similar in the two countries. The average British income of £1,300 is thus equivalent to \$6,760 in the USA. To this must be added the value of medical services and higher education which in Britain is paid for almost entirely by taxation: if I remember rightly (I do not have access to the exact figures here) they amount to about £2,000 million per annum or £100 per annum per employed person, equivalent to \$1,000 in the USA (because the rate of exchange for professional services ranges from 8 to 11). The average British income is therefore worth \$7,760 in the USA.

The average US income (March 1969) is \$9,430 (*New York Times*, April 27, 1969).

Thus the average British income is equivalent, in purchasing power, to 80 per cent of the average US income. A similar survey recently carried out by the UN Secretariat estimated it at rather more than 70 per cent, but may not have included medical services and higher education.

Can we equate this directly with the "standard of living"? I think that before doing so we should add something for the value of public services, utilities and buildings, and these are better by far in Britain than in the USA. How much is added depends on how much weight is to be given to quality of environment; I doubt that British people would rate it below consumption of manufactured goods. The British "standard of living" is then 90 per cent or more of that in the USA.

American wealth is a myth; it serves no useful purpose to Britain to perpetuate it.

Yours faithfully,

V. C. REDDISH

Town House Motel,
15661 Euclid Avenue,
East Cleveland,
Ohio 44112, USA,
and Department of Astronomy,
University of Edinburgh.

The Seychelles

SIR,—In the article "Morphological Continental Drift Fit of Australia and Antarctica" by W. P. Sproll and R. S. Dietz (*Nature*, 222, 345; 1969) reference is made on p. 347 to the "Seychelle Islands".

This usage is incorrect. The islands are named for the Marquis de Séchelles and should be referred to individually or collectively as the "Seychelles".

Yours faithfully,

R. POCKLINGTON

Institute of Oceanography,
Dalhousie University,
Halifax, Nova Scotia, Canada.

Scientific Training in Africa

SIR,—On leave from Botswana, I have only just read the letter from Gustav Jahoda (*Nature*, 220, 1356; 1969) in which evidence was given that neither "university education in general . . . nor any particular type of course, including scientific study, had any discernible impact on magico-mythical beliefs entertained by the (African) students". The writer suggested that more direct methods of reducing such beliefs might have to be explored if the prevalence of such beliefs is an obstacle to the growth of scientific activity.

At Swaneng Hill School in Botswana there are two main lines of attack on this problem. One lies in teaching science so that three main points are explicit: that physical happenings have a physical cause, that a knowledge of science leads to a mastery of the environment and that superstition inhibits progress by reducing self-confidence and the will to tackle physical problems. Wherever possible there are free discussions where new material encountered in science lessons conflicts with traditional beliefs. We try to lead our students to reach their own conclusions over a period of time, rather than to call for an instant rejection of long-held beliefs.

The science teaching is reinforced by a course in development studies taken by all students. This course traces the ways in which primitive societies have developed into modern industrial nations. There is a section dealing with scientific development, in which the achieve-

ments and limitations of earlier cultures are discussed, modern scientific method is studied and the relevance of the successful study of the physical world to economic development made clear.

This course, originally confined to Swaneng Hill School, has now been accepted for the syllabus of the Junior Certificate of the Examinations Council of the University of Botswana, Lesotho and Swaziland for a trial period of four years and a textbook will shortly be published in draft form.

It is too early to assess fully the results of this combined approach to the problem of magico-mythical beliefs. To date we find that most students go through a phase in which they accept what is learnt in school without entirely relinquishing their earlier beliefs, but the balance between the two attitudes changes until, by the end of the fifth year, there is an active looking for physical causes of events and a real eagerness to apply their knowledge of science to the solution of local economic problems.

True, our students retain a great many superstitious beliefs, but then so do many European students—it is surely the balance which is important.

Yours faithfully,

SHEILA BAGNALL

Swaneng Hill School,
Serowe,
Botswana,
and 22 Nevern Road,
London SW5.

Potent LSD

SIR,—John Tooze's review of *The Day of St Anthony's Fire* by John G. Fuller (*Nature*, 222, 495; 1969) is an entertaining story of what has been thought to have been an outbreak of ergotism which struck 230 inhabitants of Pont-Saint-Esprit in August 1951 and killed five. Since most people have only access to the review but not the book, I would like to clarify some of the points which may not have been available to either author or reviewer, both of whom believe that LSD in the flour was the culprit.

LSD-25 is not "produced by *Claviceps purpurea* in some conditions of fermentation", but *Claviceps paspali* in submerged culture can yield lysergic acid methyl carbinolamide, a derivative of LSD. The mass poisoning through flour, however, has been shown to be entirely unrelated to ergot and its derivatives—including LSD—as evidenced from the unequivocal negative findings on bread samples which were collected personally by Dr A. Hofmann—the discoverer of LSD—immediately after the catastrophe. (According to a personal letter dated August 7, 1960, from Dr Artur Brack, Vice-Director of Research at the Pharmaceutical Departments at Sandoz, Basel, and a friend and colleague of Dr A. Hofmann.) The culpable compound was in fact identified as a mercury guanidine derivative (trade name 'Panogen') intended for the protection of grain from insects.

The initial rise in the number of overly favourable publications on a new medical discovery is usually followed by a nearly exponential decay as a function of time and an overly critical attitude. No wonder, then, that LSD is now the fashionable scape-goat for dramatic evils past and present.

Yours faithfully,

ROLAND FISCHER

Departments of Psychiatry and Pharmacology,
College of Medicine,
The Ohio State University,
Columbus, Ohio 43210.

University News

Dr M. H. Harmel has been appointed chairman of the newly created department of anaesthesiology at the **University of Chicago**.

Dr R. N. Zare, University of Colorado, has been appointed professor of chemistry at **Columbia University**.

Dr M. S. Losowsky has been appointed professor of medicine at St James's Hospital, **University of Leeds**.

Dr A. K. Holliday has been appointed to the Grant professorship of inorganic chemistry at the **University of Liverpool**.

The title of professor of biochemistry has been conferred on **Dr J. B. Jepson** in respect of his post at the Middlesex Hospital Medical School, **University of London**.

The title of professor of industrial sociology has been conferred on **Miss Joan Woodward** in respect of her post at Imperial College of Science and Technology, **University of London**.

Professor Sir Hedley Atkins has accepted the invitation of the council of Queen Elizabeth College, **University of London**, to become its chairman in succession to the late Sir Thomas Creed.

Dr P. E. Palmer, University of Capetown, has been appointed professor of radiology at the **University of Pennsylvania**.

Dr A. H. Jackson, University of Liverpool, has been appointed to the chair of organic chemistry at University College, Cardiff, **University of Wales**.

Dr D. Bellamy, University of Sheffield, has been appointed to the chair of zoology at University College, Cardiff, **University of Wales**.

Dr A. Sabin, Cincinnati University, has been elected president of the **Weizmann Institute of Science**, Rehovot, Israel.

Appointments

Dr R. J. Mackin, jun., has been appointed manager of the Jet Propulsion Laboratory's Space Sciences Division, California. He succeeds **Dr D. P. Burcham**, who has been named development manager for space science in the laboratory's office of Research and Advanced Development.

Dr W. E. Duckworth has been appointed director of research at the **Fulmer Research Institute** in succession to Mr E. A. G. Liddiard, the first director, who will remain on the board as a consultant to the institute.

Announcements

Professor S. T. Butler, University of Sydney, **Professor G. W. K. Cavill**, University of New South Wales, **Professor D. P. Craig**, Institute of Advanced Studies, Australian National University, **Professor A. R. Main**, University of Western Australia, **Dr D. Metcalf**, Walter and Eliza Hall Institute of Medical Research, Melbourne, **Dr B. Morris**, Australian National University, **Professor Hanna Neumann**, School of General Studies, Australian National University, **Dr H. C. Coombs**, Australian National University, and **Sir Maurice Mawby**, Conzinc Riotinto of Australia, Limited, have been elected fellows of the Australian Academy of Science. **Dr D. F. Martyn** has been elected president of the Australian Academy of Science, **Professor A. J. Birch** has been elected treasurer, **Professor G. M. Badger** secretary (physical sciences), **Professor R. J. Walsh** secretary (biological sciences) and **Dr A. L. G. Rees** secretary (international relations).

Professor Ephraim Katchalski, Weizmann Institute of Science, has been selected as the second recipient of the **Linderstrøm-Lang Gold Medal**.